Remarks

This is in response to the Official Office Action of September 8, 2005, granting reexamination of U.S. Patent 6,209,637.

MGM Well Service, Inc. hereby waives a patent owner's statement and offers the amended claims as being patentable over the prior art in the Petition for Reexamination and in the Invention Disclosure Statement filed herewith.

Attached to this Amendment is a series of pages containing the status of the claims and an explanation of the support in the disclosure of the patent for the changes to the claims made by this Amendment.

There is an issue of new matter relating to claims 13, 17, 32 and 33. As an example, Claim 17 recites, inter alia,

> the upper section having a first ratio of surface area to weight and the lower section having a second ratio of surface area to weight, the second ratio being higher than the first ratio. . . .

This language appears in column 5, lines 50-56 of U.S. Patent 6,209,637. In a way, the significance of this is awkward to understand and may be more understandable when viewed slightly differently. Patent 6,209,637 says:

area/weight of mandrel > area/weight of sleeve.

The significance of this may be better understood by rearranging this equation to read:

weight/area of mandrel < weight/area of sleeve; and thus

weight/area of sleeve > weight/area of mandrel.

Because the weight/area of the sleeve is greater than the weight-/area of the mandrel, it means that the sleeve will fall faster in the well than the mandrel. This is the opposite of the Russian prior art patents and publications, Casey and Burgher for the following reasons.

One will recollect that the Russian devices, Casey and Burgher do not hold the sleeve at the surface so the ball and sleeve start falling into the well at about the same time. It is clear that the Russian devices, Casey and Burgher have to make the ball fall faster than the sleeve so the ball reaches the bottom of the well before the sleeve catches up to it. Otherwise, the sleeve would catch up to the ball before they reach the bottom of the well, the sleeve and ball would unite and start upward movement in the well which would occur at a time before reaching liquid in the bottom of the well and would thus be ineffective or inefficient to remove liquid from the well.

The fact that the sleeve falls faster than the lower section has an important advantage. There will be times during upward movement of the sleeve and lower section when the piston stalls for some reason and wants to fall to the bottom. The prior art devices will separate and fall separately to the bottom because the ball falls faster than the sleeve. In the device of claim 17, the

sleeve falls faster than the lower member, meaning that it has the ability to catch up with the lower member if they separate in the well before the end of upward movement. If the sleeve catches up with the lower member as they separately fall to bottom, the piston restarts upward movement without retracing its way back to the bottom of the well. The prior art devices have the defect in that there is the potential for the well to have made additional liquid while the ball and sleeve are retracing their way back to the bottom of the well. The additional liquid may be so much that the piston is unable to lift the liquid, meaning that the well dies. In the device of claim 17, the sleeve and lower member have the potential to reconnect without picking up any substantial additional liquid load, meaning that the plunger lift is less likely to cause the well to load up and die.

It must be conceded that the specification in U.S. Patent 6,209,637 in column 5, lines 54-56 does not state, in words of one syllable, that

> the surface area of the upper section being a surface area effective to move the upper section upon the creation of a differential pressure thereacross, the surface area of the lower section being a surface area effective to move the lower section upon the creation of a differential pressure thereacross.

However, the discussion beginning at column 5, line 36 is talking about the surface areas that are effective to move the sleeve and mandrel in response to pressure differentials across the sleeve and

mandrel. For example, beginning in column 5, line 44 the specification states

> the downwardly facing area of the sleeve 30 is approximately 1.857 square inches. A mandrel 40 for such a sleeve will have a plat 68 of an O.D. of 2.125" and its surface area is somewhat less than 3.547 square inches because of the slots 70. When the sleeve 38 is nested onto the mandrel 40, the O.D. of the sleeve is slightly larger than the plate 68 as suggested by the dashed lines in FIG. 4. It will be seen that the area of the mandrel 40 is larger than the area of the sleeve 38 so that any pressure drop applies a greater force to the mandrel 40 than to the sleeve 38. In addition, the ratio of surface area to weight of the mandrel 40 is greater than the ratio of surface area to weight of the sleeve 38. (Emphasis added)

It is accordingly submitted that the surface areas discussed in this paragraph are surface areas which are effective to move the sleeve and lower section in response to pressure differentials across them. It is accordingly submitted that the last clause of claim 17 is supported in the specification and is not new matter. There is similar language in claims 13, 32 and 33 and the same argument applies.

It is accordingly submitted that the above claims are allowable and early steps toward issuance of a Certificate of Reexamination are earnestly solicited.

Respectfully submitted,

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I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner for Patents, PO Box 1450, Alexandria, VA 22313-1450 on 11/8/05

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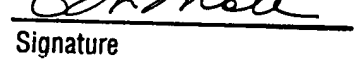

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1. (Amended) A plunger lift for a well producing through an above ground well head and

see the embodiment of Figure 1 and column 3, lines 63-65

a production string communicating with a hydrocarbon formation, comprising

a free piston having at least two sections, movable independently downwardly in the well, the sections being united at the bottom of the well for upward movement together in the well and having an exterior seal for pushing liquid, above the piston, upwardly, wherein the sections nest together during upward movement in the well;

the sections comprising an upper sleeve having a passage therethrough and a lower member lodging in the passage during upward movement in the well;

see the embodiment of Figure 1 and paragraph bridging columns 6 and 7

a separating rod for receiving the sleeve near an end of upward movement of the piston in the well and thereby dislodging the lower member from the sleeve for separating the piston sections

adjacent the end of upward movement in the well, the separating rod having a lower end in the well head above ground level; and

see the embodiment of Figure 1 and the paragraph beginning in column 6, line 7

a device for holding the sleeve in the well head above ground level.

see the embodiment of Figure 1 and column 4, line 19

2. (Original) The plunger lift of claim 1 wherein the piston comprises an upper section, a lower section and no other section.

3. (Amended) The plunger lift of claim 2 wherein [a first of the sections comprises a sleeve having] the sleeve provides the seal thereon and further comprising a central passage therethrough and a second of the sections comprises a mandrel having a pin receivable in the sleeve during upward movement in the well.

this amendment is made necessary by the amendments to claim 2, i.e. there is already an antecedent basis for "sleeve" in amended claim 2

4. (Original) The plunger lift of claim 1 further comprising means for sealing between the first and second sections when the sections nest together.

5. (Original) The plunger lift of claim 4 wherein the first section comprises an upper section and the second section comprises a lower section, below the upper section.

6. (Original) The plunger lift of claim 5 wherein the lower section provides t lest one centralizer for centering the lower section in the production string.

7. (Original) The plunger lift of claim 5 wherein the lower section provides at least two axially spaced centralizers for centering the lower section in the production string.

8. (Original) The plunger lift of claim 1 wherein the sections are separated during downward movement into the well.

9. (Original) The plunger lift of claim 1 comprising a bumper spring for positioning near the formation for engaging and cushioning impact of one of the sections at a location adjacent an end of downward movement in the well.

10. (Cancelled)

11. (Amended) The plunger lift of claim [10] 1 comprising means for releasing the [first section] sleeve from the [catcher] device.

this amendment is made necessary by the amendments to claim 1 and the cancellation of claim 10

12. (Amended) A plunger lift for a well producing through a production string communicating with a hydrocarbon formation and through a well head above ground level providing a valve for closing the production string

see the embodiment of Figure 1 and column 3, lines 63-65

, comprising

a free piston having at least two sections, movable independently downwardly in the well, the sections being united at the bottom of the well for upward movement together in the well and having an exterior seal for pushing liquid, above the piston, upwardly, a first of the sections provides a first flow bypass around the first section allowing the first section to move downwardly in the well against the flow of formation products

upwardly in the well and a second section of the sections provides a restrictor for reducing the size of the first flow bypass when the first and second sections are united;

a decoupler, on the well head and above ground level, for separating the piston into separate sections in response to upward movement of the piston thereby allowing the sections to fall separately into the well, the decoupler being removable from the well head to provide a location where the piston sections jointly collect, the well head including a gas flow passage below the location so the piston sections may be removed from the well head after removing the decoupler and closing the valve; and

see the embodiment of Figure 1 and column 6, lines 59-65

a device on the well head for holding a first of the sections and then releasing the first section in response to a signal.

see the embodiment of Figure 1 and column 6, lines 34-58

13. (Amended) A plunger lift for a well producing through a production string communicating with a hydrocarbon formation comprising

a free piston having at least [two sections] and upper section and a lower section,

see the embodiment of Figures 1-2 and column 7, line 50

movable independently downwardly in the well, the sections being united at the bottom of the well for upward movement together in the well and having an exterior seal for pushing liquid, above the piston, upwardly; the ratio of surface area to weight of the lower section being greater than the ratio of surface area to weight of the upper section, the surface areas being surface areas effective to move the sections upon the creation of a differential pressure thereacross; [and]

column 5, lines 50-56

means for separating the sections adjacent an end of upward movement in the well; and

a device for holding the upper section adjacent the end of upward movement in the well for a time at least sufficient to allow the lower section to fall to the bottom of the well before the upper section reaches the bottom of the well.

column 7, lines 20-25

14. (Cancelled)

15. (Amended) A plunger lift for a well producing through a production string communicating with a hydrocarbon formation and through a well head above ground level,

see the embodiment of Figure 1 and column 3, lines 63-65

comprising

a free piston having at least upper and lower sections, movable independently downwardly in the well, the sections being united at the bottom of the well for upward movement together in the well and having an exterior seal for pushing liquid, above the piston, upwardly, the lower section being configured to move upwardly upon exposure to a predetermined pressure differential before the upper section moves,

a decoupler for separating the piston into separate sections at a location in the well head in response to upward movement of the piston thereby allowing the sections to fall separately into the well,

see the embodiment of Figure 1 and column 3, lines 19-25

a device for delaying downward movement of the upper section from the location during each cycle of movement of the upper section, the duration of the delay being sufficient to allow the lower section to reach a position adjacent the formation before the upper section reaches the position; and

column 7, lines 20-25

a controller for varying duration of the delay.

column 7, lines 20-25

16. (Original) The plunger lift of claim 15 wherein the lower section has more downwardly facing area that the upper section whereby a pressure differential across the united upper and lower sections produces a greater upward force on the lower section than on the upper section if the sections move apart.

17. (Amended) In a plunger lift for lifting liquids from a well producing through a production string communicating with a

hydrocarbon formation, comprising a piston having separate upper and lower

see the embodiment of Figure 1 and column 7, line 50

sections movable independently downwardly into the well, each of the separate sections providing a downwardly facing cross-sectional area that is insufficient to move the section upwardly in response to gas flow emitting from the formation, the upper section having a first ratio of surface area to weight and the lower section having a second ratio of surface area to weight, the second ratio being higher than the first ratio, the surface area of the upper section being a surface area effective to move the upper section upon the creation of a differential pressure thereacross, the surface area of the lower section being a surface area effective to move the lower section upon the creation of a differential pressure thereacross.

column 5, lines 50-55

18. (Amended) The plunger lift of claim 17 wherein [a first of the section is an upper section and a second of the sections is a lower section,] the lower section having more downwardly facing area than

the upper section whereby a pressure differential across the united upper and lower sections produces a greater upper force on the lower section than on the upper sections if the sections move apart.

19. (Original) In a plunger lift for lifting liquids from a well producing through a production string communicating with a hydrocarbon bearing formation and through a well head, comprising

a piston and a decoupler adjacent the well head for separating the piston into separate sections in response to upward movement of the piston thereby allowing the sections o fall separately into the well;

means uniting the sections together adjacent the formation for movement together upwardly in the production string to push liquids upwardly in the well in response to gas flow into the production string from the formation;

a bumper spring inside the production string adjacent the formation for engaging the piston and cushioning impact near an end of downward piston movement; and

a catcher adjacent the well head for catching a first of the sections and means for releasing the first section in response to a signal.

20. (Original) A multipart piston for a plunger lift comprising

an upper sleeve providing a central passage and an exterior seal assembly; and

a lower mandrel movable from a first position out of contact with the upper sleeve to a second position coupled with the sleeve and having at least one centralizer and a pin received in the passage in the second position and providing a fishing shoulder intermediate the passage.

21. (Original) The multipart piston of claim 20 further comprising means for sealing between the sleeve and mandrel.

22. (Original) The multipart piston of claim 20 further comprising a fishing shoulder on the upper sleeve.

23. (Amended) A method of lifting liquids from a well producing hydrocarbons from a formation with a plunger lift having a multipart piston, comprising dropping parts of the piston independently in the well, uniting the parts of the piston into a unit near the formation and moving the unit upwardly in the well in response to formation gasses passing into the well and thereby pushing liquid upwardly with the piston, wherein the dropping step comprises repeatedly dropping a first part of the piston into the

well, pausing for a time period, then dropping a second part of the piston into the well and varying the time period between successive drops.

original claims 26 and 27, i.e. column 10, lines 1-9

24. (Original) The method of claim 23 wherein the dropping step occurs when gas is flowing upwardly in the well.

25. (Original) The method of claim 23 wherein the well includes a well head and wherein the dropping step occurs when gas is flowing upwardly in the well and exiting through the well head.

26. (Cancelled)

27. (Cancelled)

28. (Amended) A plunger lift for a well producing through a production string communicating with a hydrocarbon formation, comprising

a free piston having at least first and second sections, movable independently downwardly in the well, the sections being united at the bottom of the well for upward movement together in

the well and having an exterior seal for pushing liquid, above the piston, upwardly, the first section comprising a sleeve having means on the exterior of the sleeve for minimizing fluid bypass on the outside of the sleeve and a passage allowing formation contents to flow through the sleeve when the sleeve is falling into the well and the second section includes a restrictor for reducing flow through the passage when the sections unite at the bottom of the well;

a decoupler for separating the first and second sections at a location adjacent upward movement in the well and allowing a second section to fall into the well;

see the embodiment of Figure 1 and the paragraph beginning at column 6, line 7

a device for holding the first section adjacent the location and, after a time period, dropping the first section into the well; and

see the embodiment of Figure 1 and original claim 26

a controller for varying the time period.

original claim 27

29. (Amended) A plunger lift for a well producing through a production string communicating between a hydrocarbon formation and a well head, comprising a free piston having at least first upper and second lower sections, movable independently downwardly in the well, the sections including means joining the sections together at the bottom of the well for upward movement together in the well and having an exterior seal for pushing liquid, above the piston, upwardly, the ratio of surface area to weight of the lower section being greater than the ratio of surface area to weight of the upper section.

see column 5, lines 50-55

30. (Amended) The plunger lift of claim 29 wherein the well head [comprises] is above ground level and comprises

see the embodiment of Figure 1 and column 3, lines 63-65

a decoupler for separating the free piston into separate sections, the decoupler comprising a separating rod having a lower end in the well head above ground level.

see the embodiment of Figure 1 and column 3, lines 63-65

31. (Original) The plunger lift of claim 30 wherein the first section comprises a passage therethrough and the second section comprises a restrictor for reducing the size of the passage and the decoupler comprises a downwardly extending member projecting at least partially through the passage for engaging the restrictor and dislodging the second section from the first section.

32. (New) The plunger lift of claim 29 wherein the surface areas are surface areas effective to move the upper and lower sections upon the creation of differential pressures across the upper and lower sections.

column 5, lines 50-55

33. (New) The plunger lift of claim 15 wherein the surface areas are surface areas effective to move the upper and lower sections upon the creation of differential pressures across the upper and lower sections.

column 5, lines 50-55

34. (New) The plunger lift of claim 13 wherein the well produces through a well head above ground level and the device, on the well head, holds the upper section above ground level.

see the embodiment of Figure 1 and column 3, lines 63-65

35. (New) The plunger lift of claim 13 wherein the device physically contacts the upper section.

see the embodiment of Figure 1 and the paragraph beginning at column 6, line 7

36. (New) The plunger lift of claim 13 wherein the upper section comprises a sleeve having a passage therethrough and the lower section nests in the passage during upward movement in the well and

original claim 1, i.e. column 7, lines 47-48

the separating means comprises a rod for receiving the sleeve near the end of upward movement of the piston and thereby dislodging the lower section from the upper section and

see the embodiment of Figure 1 and the paragraph beginning at column 6, line 7

wherein the device holds the sleeve in the well head above ground level.

see the embodiment of Figure 1 and column 3, lines 63-65

37. (New) The plunger lift of claim 33 wherein the sleeve comprises a recess on a side thereof

see the embodiment of Figure 2

and the device comprises a retractable detent for extending into the recess and thereby holding the sleeve.

see the embodiment of Figure 1 and column 6, lines 46-48

38. (New) The plunger lift of claim 1 wherein the well produces through a well head providing a valve closing the production string,

see the embodiment of Figure 1 and column 13-17

the decoupler being removable from adjacent the well head to provide a location where the piston sections jointly collect, the well head including a gas flow passage below the location so the piston sections remain united in response to the flow of gas through the well head whereby the joined piston sections may be removed from the well head after removing the decoupler and closing the valve.

column 59-65

39. (New) The plunger lift of claim 1 wherein the well comprises a well head above ground level and the separating rod and device are located above ground level on the well head.

see the embodiment of Figure 1 and column 3, lines 63-65

40. (New) The plunger lift of claim 1 wherein the well head comprises a flow line opening into the well head above an uppermost position of the upper section, and a bypass conduit opening into

the well head below the bottom of the upper section in its uppermost position, the bypass conduit being connected to the flow line.

see the embodiment of Figure 1, column 4, lines 19-22

41. (New) The plunger lift of claim 12 wherein the well head comprises a flow line opening into the well head above an uppermost position of the upper section, and a bypass conduit opening into the well head below the bottom of the upper section in its uppermost position, the bypass conduit being connected to the flow line.

see the embodiment of Figure 1, column 4, lines 19-22

42. (New) The plunger lift of claim 13 wherein the well head comprises a flow line opening into the well head above an uppermost position of the upper section, and a bypass conduit opening into the well head below the bottom of the upper section in its uppermost position, the bypass conduit being connected to the flow line.

see the embodiment of Figure 1, column 4, lines 19-22

43. (New) The plunger lift of claim 15 wherein the well head comprises a flow line opening into the well head above an uppermost position of the upper section, and a bypass conduit opening into the well head below the bottom of the upper section in its uppermost position, the bypass conduit being connected to the flow line.

see the embodiment of Figure 1, column 4, lines 19-22

44. (New) The plunger lift of claim 17 wherein the well head comprises a flow line opening into the well head above an uppermost position of the upper section, and a bypass conduit opening into the well head below the bottom of the upper section in its uppermost position, the bypass conduit being connected to the flow line.

see the embodiment of Figure 1, column 4, lines 19-22

45. (New) The plunger lift of claim 28 wherein the well produces through a well head and the production string and the well head

comprises a flow line opening into the well head above an uppermost position of the upper section, and a bypass conduit opening into the well head below the bottom of the upper section in its uppermost position, the bypass conduit being connected to the flow line.

see the embodiment of Figure 1, column 4, lines 19-22

46. (New) The plunger lift of claim 29 wherein the well head comprises a flow line opening into the well head above an uppermost position of the upper section, and a bypass conduit opening into the well head below the bottom of the upper section in its uppermost position, the bypass conduit being connected to the flow line.

see the embodiment of Figure 1, column 4, lines 19-22